Our Homes Suck! And, That is Why Our Kids Have Sinus Problems

Raising the Bar in Home Performance Contracting

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Why Our Homes “Suck”: Stack Effect

Stack Effect in Crawl Space Ventilation
What Bugs You About Your Home?
BPI’s Scope of Services

- Industry Consensus Standards
- BPI GoldStar Contractor Program
- BPI Rater Program
- Technician Certification
- Contractor Support Services
State and Utility Energy Efficiency Programs Were Born
But, With Incentives Comes Regulation

Cost Effectiveness Tests Were Developed to Govern What Measures Meet Payback Requirements

Or, the utilities are allowed to introduce what I call “dreamed” savings rebate programs.

Alphabet Soup of Cost-Effectiveness Tests
Need for Home Energy Retrofit Contracting

About a **one-third** of **80 million** owner-occupied homes are now at least **45 years old** and an additional third is **between 25 and 45 years old** meaning that a large majority of our homes were built before modern energy codes and are drafty, uncomfortable and expensive to operate.
We’re Doing Residential Energy Efficiency All Wrong

Nate Adams says radical changes are needed in the home-performance business.

Nate Adams  
September 8, 2015

Utilities are now spending nearly $7 billion a year on energy-efficiency programs. It seems we have little to show for it aside from expensive consultants who will model any results you would like.

These programs tend to focus their marketing on the energy savings or money savings from the projects. Consumers don’t care. If they did, we would see geometric growth instead of a resounding “meh.”

Solving the Energy Efficiency Quandary

New research showing dismal results for energy efficiency in homes highlights the need for performance-based measures.

By Richard Martin on July 8, 2015

American industries have done a good job of becoming more efficient. According to a new report from the American Council for an Energy-Efficient Economy, the energy intensity of the U.S. economy (measured in BTUs consumed per dollar of GDP) has roughly halved since 1980. Energy use in the United States rose by 26 percent from 1980 to 2014, according to the group – a period when the U.S. GDP went up 149 percent.

Making homes more energy efficient has proved more difficult – and harder to measure. While the energy intensity of the residential sector has gone down slightly in recent years, the increase in average house size (along with greater use of home electronics) has meant that overall energy consumption by households has continued to rise, according to the U.S. Energy Information Administration. That has fueled a search for more effective residential efficiency programs – and intensified the debate over their benefits relative to their costs.

That debate has gotten hotter since the release, in late June, of a study by researchers at the University of Chicago and the University of California, Berkeley. Entitled Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program, the study examined 30,000 Michigan households participating in the federal Weatherization Assistance Program (WAP), which has provided free home upgrades like insulation and weather stripping to low-income households since 1978. The results were striking: “The costs to deploy the efficiency upgrades were about double the energy savings.”
Ramping Up Home Performance

Scenarios for Achieving Scale:

<table>
<thead>
<tr>
<th>State</th>
<th>Units of Housing</th>
<th>10,000 Years</th>
<th>1000 Years</th>
<th>100 Years</th>
<th>10 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>133,957,180</td>
<td>13,396</td>
<td>133,957</td>
<td>1,339,572</td>
<td>13,395,718</td>
</tr>
</tbody>
</table>

Are we on a 1000 year or a 10,000 year cycle for upgrading the performance of our existing housing stock?
Drivers for Home Performance Contracting?

- Dust and Allergies
- Drafts and Comfort
- **High Utility Bills?**
- Asthma and Sinusitis
- Moisture and Mold
- Climate Change
- Energy Independence
Here are the Real Drivers for Homeowners

- Dust and Allergies
- Drafts and Comfort
- High Utility Bills
- Asthma and Sinusitis
- Moisture and Mold
- Climate Change
- Energy Independence
Let’s meet...

The NEBS
So, what are **Non-Energy Benefits**?
Typical home...full of systems...

- Drainage system
- Foundation system
- Flooring system
- Wall system
- Ceiling system
- Roof system
- Heating system
- Air conditioning system
- Ventilation & IAQ systems
- Moisture control systems
- Distribution system
- Exhaust systems
- Plumbing systems in/out
- Electric, Appliance & Lighting systems
- Energy management system

Key Question: Do you know where your fresh air comes from?
Disconnected return duct
Dead possum

Photo courtesy of Stefan Peter-Contesse
“Silly raccoon, that’s a squirrel cage.”
What happens when you:

Cool a Bonus Room with Crawl Space Air?

Photos courtesy of Chris Myers of E3 Innovate LLC
Photos courtesy of Chris Myers of E3 Innovate LLC
Energy Vanguard Blog

Do Energy Efficient Homes Cause Asthma?

The mythology lives on

“No, a house doesn’t need to breathe. No, energy efficient houses don’t cause asthma. No, the problem isn’t that we’re making houses more airtight... And, look, a lot more people are getting sick because of poor indoor air quality in homes that are **not** energy efficient in the least.”  Allison Bailes, Ph.D.
Ventilation System Approaches

**Exhaust Ventilation**
- Central exhaust fan
- Exhaust air outlet
- Air flow
- Positive air pressure
- Air infiltration
- Negative air pressure

**Supply Ventilation**
- Central supply fan
- Fresh air inlet
- Air flow
- Positive air pressure
- Air infiltration
- Negative air pressure

**Balanced Ventilation**
- Room air exhaust ducts
- Exhaust air outlet
- Supply fan
- Fresh air inlet
- Air flow
- Positive air pressure
- Air infiltration
- Negative air pressure
Dust Mites: Serious Allergens in Your Home

Caption:

Dust mites scavenging a bed sheet for dead skin.

“Dust mites are known to cause asthma to develop in people.”
Kevin Kennedy, Children’s Mercy Hospital, Kansas City, MO

Dust Mite Video:
The Invasion of the Sugar Ants: They Contaminate Your Food and Spread Salmonella
Frequently Asked Questions About Sinusitis & Mold

There is mold in my house. Why am I the only one who is sick?

You probably have an allergy to mold. 16% of the population has a genetic trait that makes them highly susceptible to mold allergies. You may be the only one in your house hold that has the trait.

I have been tested for mold allergies and my doctor has said that I do not have one. Could she be wrong?

There are two types of mold allergy test: Immediate and Delayed. The Immediate Test is based on a reaction to a skin test or IgE antibody blood test for immediate reactions to mold. It is the test that most insurance companies will cover. The Delay Test requires a blood sample to be drawn and tested which is not frequently done for cost reasons.

People with Chronic Sinusitis more than 90% show a positive mold allergen result when using the IgG blood test. However, only 30% of the same population will show a positive result when using the Immediate Test.

How do we know mold causes sickness?

Read the paper from Mayo Clinic which states that 93% for chronic sinusitis is mold related.

I have constant sinus problems. I also have joint pain and problems with my memory. Could these be caused by mold exposure?

Yes, many people notice an improvement in these conditions when they clear mold from their body and their environment.

I live in a house that is only a year old. Could there be mold in my home?

Yes. Many new houses sit in the rain during construction. To assure that your home is safe, test with mold plates. If you are not sick mold counts of 0-4 are OK. However, if you do feel sick much of the time with fatigue and sinus symptoms, you will feel best when your indoor mold counts are 0-2 colonies.
The Diagnosis and Incidence of Allergic Fungal Sinusitis

**Jens U. Ponikau, MD; David A. Sherris, MD; Eugene B. Kern, MD; Henry A. Homburger, MD; Evangelos Frigas, MD; Thomas A. Gaffey, MD; and Glenn D. Roberts, PhD**

- **Objective:** To reevaluate the current criteria for diagnosing allergic fungal sinusitis (AFS) and determine the incidence of AFS in patients with chronic rhinosinusitis (CRS).

- **Methods:** This prospective study evaluated the incidence of AFS in 210 consecutive patients with CRS with or without polyposis, of whom 101 were treated surgically. Collecting and culturing fungi from nasal mucus require special handling, and novel methods are described. Surgical specimen handling emphasizes histologic examination to visualize fungi and eosinophils in the mucin. The value of allergy testing in the diagnosis of AFS is examined.

- **Results:** Fungal cultures of nasal secretions were positive in 202 (96%) of 210 consecutive CRS patients. Allergic mucin was found in 97 (96%) of 101 consecutive surgical cases of CRS. Allergic fungal sinusitis was diagnosed in 94 (93%) of 101 consecutive surgical cases with CRS, based on histopathologic findings and culture results. Immunoglobulin E-mediated hypersensitivity to fungal allergens was not evident in the majority of AFS patients.

- **Conclusion:** The data presented indicate that the diagnostic criteria for AFS are present in the majority of patients with CRS with or without polyposis. Since the presence of eosinophils in the allergic mucin, and not a type I hypersensitivity, is likely the common denominator in the pathophysiology of AFS, we propose a change in terminology from AFS to eosinophilic fungal rhinosinusitis.


AFS = allergic fungal sinusitis; CRS = chronic rhinosinusitis; CT = computed tomographic; IgE = immunoglobulin E; RAST = radioallergosorbent test
Okay, so this probably isn’t your house.

But, this probably is.
A 67% decline in emergency room visits due to energy retrofits!

Aetna: Savings of over $800 for each asthma-related ER visit ($8,800 for hospital stay).

Wegowise, a start-up that identifies energy efficient homes by analyzing utility data, has partnered with a national non-profit to upgrade low-income housing around Baltimore, Maryland. A recent pilot project produced an unforeseen result: emergency room visits among residents who were helped fell by 67 percent.

The Environmental Protection Agency says that buildings in the U.S. waste an average of 20 percent of the US$400 billion plus that’s spent on energy annually, but not every building owner has the same resources to eliminate waste. Homes that aren’t sufficiently weatherized can be hazardous to health. Wegowise and Green & Healthy Homes Initiative (GHHI), a national non-profit, are partnering to help economically disadvantaged families fix weatherization issues that negatively impact their household budgets and lives.

Wegowise provides a Web application to track and analyze utility data. Building owners would use its application to identify their most wasteful properties and greatest potential savings with upgrades. The entire process is automated by the application, which is available to anyone in the U.S. as a monthly subscription. Wegowise saved the GHHI from having to scour through spreadsheets to target homes that were in the greatest need of health and energy upgrades. 31 homes were selected for repairs.
Case Study: Warm Up New Zealand: Heat Smart Programme

- established May 2009
- government initiative primarily aimed at saving energy
- with recognition that health improvements will also be significant
- $347 million in government funding
- 4 year programme to provide subsidies for insulation - under floor and ceiling, other cost effective energy efficiency measures and a clean heating device
- two levels of funding – general income and Community Service Card Holders
- target 188,500 homes built pre 2000
- roughly 20-25% of all houses built pre 2000
Health Benefit Studies on Retrofitted houses

- Results of the studies undertaken so far:
  - admissions to hospitals for respiratory conditions drop by 43%
  - days off school reduce by 23%
  - days off work drop 39%
  - identified the costs of certain diseases
  - causal links between cold and damp housing and poor health
  - psychological and stress benefits
  - quantitative risks to respiratory health established
  - calculated the percentage of health outcomes resulting from indoor dampness and mould - PAFs
    - 25-35% in general population
    - Maori and Pacific Island People up to 35%
  - Over 90% of benefits are health
CAN HOME UPGRADES IMPROVE OCCUPANT HEALTH?

Results from Two Meta-analyses
**Table 1. Summary of Intervention Findings**

<table>
<thead>
<tr>
<th>Panel</th>
<th>Sufficient Evidence</th>
<th>Needs More Field Evaluation</th>
<th>Needs Formative Research</th>
<th>No Evidence or Ineffective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1: Interior Biological Agents (Toxins)</td>
<td>Multi-faceted tailored asthma interventions</td>
<td>Dehumidification</td>
<td>Carpet treatments</td>
<td>Bedding encasement alone</td>
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<tr>
<td></td>
<td>Integrated Pest Management (allergen reduction)</td>
<td>General &amp; local exhaust ventilation (kitchens &amp; baths)</td>
<td>One-time professional cleaning</td>
<td>Sheet washing alone</td>
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<tr>
<td></td>
<td>Moisture intrusion elimination</td>
<td>Air cleaners (to reduce asthma)</td>
<td>Acaricides</td>
<td>Upholstery cleaning alone</td>
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<tr>
<td></td>
<td></td>
<td>Dry steam cleaning</td>
<td></td>
<td>Air cleaners releasing ozone</td>
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<td></td>
<td></td>
<td>Vacuuming</td>
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<tr>
<td>Panel 2: Interior Chemical Agents (Toxics)</td>
<td>Radon air mitigation through active subslab depressurization</td>
<td>Radon mitigation in drinking water</td>
<td>Radon air mitigation using passive systems</td>
<td>Portable HEPA air cleaners to reduce environmental tobacco smoke and formaldehyde</td>
</tr>
<tr>
<td></td>
<td>Integrated Pest Management (pesticide reduction)</td>
<td>Portable HEPA air cleaners to reduce particulate</td>
<td>Improved residential ventilation</td>
<td>Air cleaners using or releasing ozone</td>
</tr>
<tr>
<td></td>
<td>Smoking bans</td>
<td>Attached garage sealing to limit VOC infiltration</td>
<td>VOC avoidance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lead hazard control</td>
<td>Participulate control by envelope sealing</td>
<td></td>
<td>Single professional cleaning to reduce long-term lead exposure</td>
</tr>
</tbody>
</table>

Source: Housing Interventions and Health: A Review of the Evidence, National Center for Healthy Housing, 2009
**Children and Adolescents:**

- Asthma symptom days: median decrease of 21 days per year (6 studies).
- School days missed: median decrease of 12 days per year (5 studies).
- Acute healthcare visits: combined median decrease of 0.57 visits per year (10 studies)

Source: [http://www.thecommunityguide.org/asthma/multicomponent.html](http://www.thecommunityguide.org/asthma/multicomponent.html)
Medicaid: Essential Benefit Rule

**New Language**- Preventive services must be *recommended* by a physician or other licensed practitioner of the healing arts within the scope of their practice under state law.

*Preventive services means services *recommended by a physician or other licensed practitioner of the healing arts acting within the scope of authorized practice under State law to - 1) Prevent disease, disability, and other health conditions or their progression; 2) Prolong life; and 3) Promote physical and mental health and efficiency*
For Medicaid patients, the proposed new rules allow for home assessment services by a non-clinical, licensed person.

This means reimbursement may soon be available for healthy home assessments!
Active conversations among DHHS/CMS and state Medicaid offices around the country:

- What will be the process?
- What will be the procedure?
- How much is allowable?
- Who will perform the work?
- What credentials will they need?
- Is the upgrade work reimbursable?

States currently working on some kind of program:
CT, KS, KY, MA, MD, MI, MO, NY, OH, OR, PA, TX, WA
So, is this your house?
Or the house of one of your customers?

Or, is it more like this?
Get a Home Energy Audit ASAP!
Toward a **Healthy Home Evaluator Micro-Credential**
Scope of HHE Credential

• The *Healthy Home Evaluator* micro-credential builds upon the knowledge of the certified [BPI Building Analyst](https://www.bpi.org) professional or [BPI Energy Auditor](https://www.bpi.org) by establishing the competencies required to conduct an in-depth healthy home environmental risk assessment.

• The *Healthy Home Evaluator* assesses and characterizes home-based environmental health and safety hazards by integrating qualitative observations with quantitative diagnostics to determine and prioritize recommendations that address existing and potential hazards.

• The *Healthy Home Evaluator* communicates the identified risks and hazards to the occupant with the goal of improving health and quality of life.
HHE: Prime Domains

- Principles of a Healthy Home (8-10%)
- Data Collection (38-42%)
- Analysis and Interpretation (18-20%)
- Recommendations and/or Scope of Work (18-20%)
- Communication and Client Education (5-10%)
- Personal Safety, Insurance and Liability (8-10%)
Thank you

Feel free to contact me at:

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